Reactive-Separator Process Unit for Lunar Regolith, Phase II

Completed Technology Project (2010 - 2012)

Project Introduction

NASA's plans for a lunar habitation outpost call out for process technologies to separate hydrogen sulfide and sulfur dioxide gases from regolith product gas streams. A low-pressure drop separation unit is needed to remove these sulfur compounds from regolith process streams that is compact and lightweight. To this end, Reactive Innovations, LLC proposes a Phase II SBIR program to continue the development of an electrochemical reactive-separation unit to selectively bind and remove the sulfur compounds into a separated stream of sulfur-based compounds. During the Phase I program, we developed and successfully demonstrated an electrochemical reactive-separation platform that binds sulfur compounds via a charge transfer process to a redox carrier that is subsequently transported across a membrane separator releasing the sulfur components. The Phase II program will continue to develop the membrane electrode assemble to improve the separation process as well as transition this technology to RIL's advanced reactor platform for more extensive testing. The Phase I effort has brought this lunar regolith reactive-separator unit to a Technology Readiness Level of 3. The Phase II program will deliver an operational prototype at a TRL of 4-5.

Primary U.S. Work Locations and Key Partners

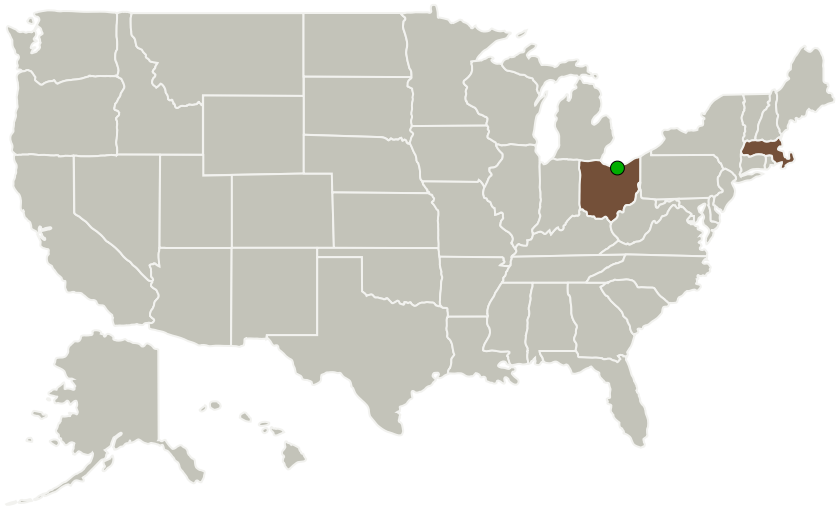

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Table of Contents

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Organizations Performing Work	Role	Type	Location
Reactive Innovations, LLC	Lead Organization	Industry	Westford, Massachusetts
Glenn Research Center(GRC)	Supporting Organization	NASA Center	Cleveland, Ohio

Primary U.S. Work Locations	
Massachusetts	Ohio

Project Transitions

February 2010: Project Start

January 2012: Closed out

Closeout Documentation:

- Final Summary Chart*(https://techport.nasa.gov/file/139387)*

Organizational Responsibility

Responsible Mission Directorate:

Space Technology Mission Directorate (STMD)

Lead Organization:

Reactive Innovations, LLC

Responsible Program:

Small Business Innovation Research/Small Business Tech Transfer

Project Management

Program Director:

Jason L Kessler

Program Manager:

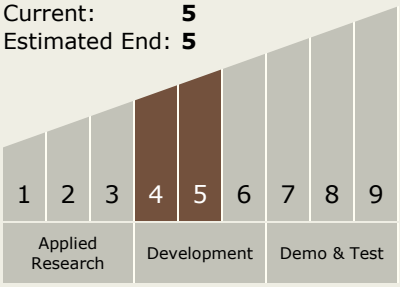
Carlos Torrez

Principal Investigator:

Michael C Kimble

Technology Maturity (TRL)

Start: **4**
Current: **5**
Estimated End: **5**



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Technology Areas

Primary:

- TX07 Exploration Destination Systems
  - TX07.1 In-Situ Resource Utilization
    - TX07.1.1 Destination Reconnaissance and Resource Assessment

Target Destinations

The Sun, Earth, The Moon, Mars, Others Inside the Solar System, Outside the Solar System